

## Minnesota's CAV Guiding Principles

---

In 2018 Minnesota established the Governor's Advisory Council on Connected and Automated Vehicles (CAV) and the CAV Office to help the state plan and prepare for emerging transportation technologies. The Council developed the state's CAV vision, mission, and goals. Below are the state's CAV Guiding Principles, developed support from the CAV Innovation Alliance and the Minnesota Office of Connected and Automated Vehicles ("CAV-X").

The goal of these Guiding Principles is to help stakeholders ask the right questions when developing CAV policy and programs in directing investment to advance a transportation system that is safe, equitable, accessible, efficient, healthy, and sustainable. These principles have the most potential when working together in synergy.

These principles help advance the U.S. Department of Transportation's vision of transportation that as an "imaginative, bold, forward-thinking engine for equity" that improves quality of life. - Secretary of Transportation Pete Buttigieg.

## Minnesota CAV Guiding Principles

---

Below are Minnesota draft CAV Guiding Principles. Each of these principles has general policy statements, followed by key questions to ask policy makers, government, industry, and community when developing new CAV programs or policies. These questions can be asked when developing policy, when scoping and selecting projects, and in evaluating program success and can be shared with local agencies, communities, and stakeholders. Principles including safety, equity and innovation should be principles reflected through all these policy and programmatic priorities. These principles are not in hierarchical order, rather they are meant to be holistically considered when developing new ideas or programs.

- 1. Safety is Paramount** – Continue to work towards a transportation system that has no fatalities and decrease severe and serious crashes. Provide multi-modal safe systems that promote transportation efficiency. Proactively address disproportionately impacted demographics that are over or under-represented in traffic safety data.
  - **Questions to ask:** Does this support safety for all communities, including people who walk, bike, use transit and other modes? Does this advance the state's Safe Routes to Schools, State Highway Safety Plan and other community health goals? Does this provide appropriate regulatory oversight to ensure compliance with safety goals? Can the CAV safely return control if an error occurs? Can the AV proactively predict the behavior of other drivers and road users? How does the CAV follow traffic laws? Does the CAV alert operators when they need to take over, if applicable? How is the safety of the vehicle validated or tested? Is the technology safe from cyber-attack and security risks? How does this policy or program advance [Toward Zero Death](#) goals and those embodied in [Complete Streets](#), [Safe Routes to Schools](#) and [Highway Safety Plans](#)? Does this provide a safety benefit to diverse geographical and/or for diverse demographics in the state? Does this create a more welcoming and physically safe environment for people of all modes?
- 2. Advance Transportation Equity** – Advance policies that promote transportation equity. View our work through an equity lens. Meaningfully engage communities to have a voice in expressing how CAV can advance their goals. Recognize transportation's role in dividing communities and recommit to removing systemic barriers. Improve affordable access to destinations in all areas, from rural communities, and people of all abilities. Uphold public interest with clarity and transparency. Transportation equity ensure the benefits and burdens of transportation spending, services, and systems are fair, which historically have not been fair, and people - especially Black, Indigenous and People of Color - are empowered in transportation decision making.
  - **Equity questions to ask:** Who was involved in the decision or policy development? Does the policy lead to disparate impacts to any one community? Does this advance the state's racial equity and social justice goals? Did you engage the public to understand community goals to use CAV technology? Did you engage communities directly impacted by the project or program? Did you allow input and feedback from the public to impact work where appropriate? Have you engaged Black, Indigenous and communities of color? Did you

involve advocacy groups for pedestrian safety, cycling, and people with disabilities? How did you give power to others? Have we informed and engaged communities enough on CAV to make informed decisions? What is the right way to communicate and inform internal and external stakeholders about project innovation and development?

3. **Promote Public Health and Sustainability** – Protect active transportation to promote healthy communities, which are vital to a thriving Minnesota. Advance system stewardship and sustainability principles to remain resilient in an ever-changing climate. Advance technology and policy that minimize environment impacts. Maximize deployment of AVs as low-emission vehicles in the near term and zero- emission vehicles in the long term. Employ eco-driving strategies. Advance goals to reduce greenhouse gas emissions and develop sustainable funding that addresses the gas-tax funding gap and more resilient transportation system funding.
  - Questions to ask: Does it promote goals in MnDOT’s [Sustainability Report](#) and the state’s [enterprise sustainability](#) goals to reduce greenhouse gas emissions and energy consumption? Does it positively affect active transportation? Does it put impacts to people over impacts to vehicles?
4. **Prioritize Shared Mobility and Accessibility** – Promote inclusive policies that meet the needs of all users. Understand that multi-modal mobility is crucial to an integrated transportation system. All transportation options must be accessible and affordable. Connect CAV technology with other modes, including freight, air, ports, rail, and others like aerial mobility. Develop intermodal interoperability to decrease congestion and maximize efficiency. Understand the role systems change plays. Support shared use over single-vehicle travel. Implement strategies like mobility hubs that reduce the effects on traffic congestion, including the resulting impacts on road safety, modal choices, emergency vehicle response time, transit performance and reliability.
  - Mobility and access questions to ask: Does this policy or program place people over vehicles? How does this policy support existing mobility principles? How does this idea promote livable, walkable communities and the ideas embedded in Complete Streets and Safe Routes to Schools? How does this support healthy land use policies that protect active transportation? How does this policy use CAV to support public transit? Is the solution affordable and available for all Minnesotans? Does this advance transportation in rural, suburban, and urban areas? Does the policy or program advance access for people with vision, ability, or auditory challenges?
5. **Innovation** – Ask questions. Embrace new ideas. Be bold. Remain nimble and flexible to shifts in current events, technology, and trends in a rapidly changing world. Embrace creativity and brainstorming new ideas. Identify gaps in current research, testing, deployment. Create opportunities for Minnesota to lead. Grow partnerships with private industry, government, researchers, businesses, and communities to advance research and programs that meet the needs of all Minnesotans. Share information with other partners throughout Minnesota, the region, and nationally. Find opportunities to collaborate research and programs with other stakeholders and communities. Advance public-private partnerships (P3s) and P4s (public-private-people partnerships) to find new investment and collaboration models.
  - Questions to ask: How does this policy allow agile, flexible, nimble changes in technology? How does this policy address the fact that some CAV technologies advance every 6 months? How can we take reasonable risks to learn and develop innovations while protecting the public interest? How can policy be reliable while allowing industry, researchers, and communities to develop new ideas? Does this support industry innovation without burdensome government regulation? Does the policy or program allow flexibility when technology changes every 6-12 months? How does this policy or program advance opportunities for collaboration with other states and countries? How can we scale up the idea or program?
6. **Agile Transportation Investment** – Transportation technology evolves rapidly, with some CAV technologies evolving as quickly as every 6 months. However traditional transportation investments can last 20-100 years. Future transportation investment needs to accommodate long-range planning with the ability to adapt more flexibly to changing technology standards and needs while responsibly investing taxpayer dollars. Advance public-private partnerships (P3s) and public-private-people/community partnerships (P4s) to find new investment and collaboration models. Advance investments that support statewide transportation improvement and highway investment plans.
  - Questions to ask: How can private industry share in the cost of public investment to support CAV? Are you considering investment models such as public-private partnerships, or P4s (public-private-people

partnership)? How do we plan for investment policies and processes that evolve along with the technology and business models? How much do we invest in technology development? How do we invest in research and development, like early research, products, and systems? How do we promote early technology development? Does this research benefit Minnesotans/Minnesota? Are there business or contracting models (like tollways or P3s) to incentivize industry to continuously operate, update, and maintain CAV and intelligent transportation systems (ITS) technology? Does the investment support safety for both people and machines? How does infrastructure monitor the AV's behavior and address traffic violations? Does the infrastructure support CAV operation? Can we make investments now that address near term needs while also addressing long-term CAV readiness? How can infrastructure monitor the AV's behavior and address traffic violations? How can we leverage open innovation opportunities like the [Minnesota CAV Challenge](#)?

7. **People-Focused Policy** – Collaborate with stakeholders and communities to develop clear laws, rules and policy for safe CAV testing and deployment to create a predictable environment for businesses and the public. Ensure the public's interests and safety are at the forefront of every decision. Protect personal information and create a secure system. Achieve a connected vehicle ecosystem that enables reliable, secure vehicle-to-infrastructure (V2I) data exchanges to support cooperative automated transportation.
  - *Questions to ask:* Does this hold the interests of the people in Minnesota as most important? Is this policy plain language while honoring the technical challenges of emerging technologies? How can businesses, researchers, government, and communities regularly rely on this policy while also promoting the ability to change it when needed? Does the technology or policy protect personal information? Does this protect confidential or proprietary industry data?
8. **Economic Prosperity & Quality of Life** – Understand the role transportation has to connect communities to jobs, healthcare, public safety, education, families, opportunity, and happiness. Understand that transportation has the ability for us to be our whole selves. Harness the opportunity for CAV to improve freight operations, efficiency, and safety. Advance solutions that promote interstate commerce and travel and interoperability of the technology across jurisdictional borders, including the Midwest.
  - *Questions to ask:* How do we upskill and reskill workers for a future automation need? How do we grow local and minority-owned businesses through CAV business growth mentorships? How can we train professionals to grow CAV skills and share knowledge through trainings and opportunities to share best practices? How do we anticipate future trends and technology growth? Did we increase access to healthcare, economic opportunity, education, markets, or other essential services? Does this partnership help grow Minnesota jobs and economy?
9. **System Resiliency thru Data Access and Security** – Advance a CAV ecosystem that enables reliable, consistent, interoperable technology. Promote data sharing across government and industry. Develop security-by-design and privacy policies to protect user information. Address whether data is shared with public agencies to evaluate the safety and performance of CAVs. Create a tort and criminal liability environment that protects the public. Protect and use dedicated short-range communications (DSRC) and the 5.9 Gigahertz (GHz) spectrum designated for “operations related to the improvement of traffic flow, traffic safety and other intelligent transportation service applications”.
  - *Questions to ask:* How is the safety of the vehicle validated or tested? Is the technology safe from cyber-attack and security risks? How is data stored, protected and managed? What procedures are in place to manage CAV data?

*Principles approved by I-CAV June 14<sup>th</sup> and approved by Governor's Advisory Council on CAV July 14, 2021*